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09/928,619	08/13/2001	James G. Shanahan	D/A1413	7995

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EXAMINER	
HIRL, JOSEPH P	

ART UNIT	PAPER NUMBER
2121	8

DATE MAILED: 06/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No	Applicant(s)	
	09/928,619	SHANAHAN, JAMES G.	
	Examiner	Art Unit	
	Joseph P. Hirl	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15-22 and 25-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15-22 and 25-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an AMENDMENT entered March 15, 2004 for the patent application 09/928,619 filed on August 13, 2001.

2. The First Office Action of October 14, 2003 is fully incorporated into this Final Office Action by reference.

Status of Claims

3. Claims 14, 23 and 24 were cancelled. Claims 1, 5-7, 20-22 and 25 are amended. Claims 27-29 are new. Claims 1-13, 15-22 and 25-29 are pending.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Shetty et al (US Pub 2003/0046253, referred to as **Shetty**).

Claim 1

Shetty anticipates extracting a set of features from the text object (**Shetty**, p 0005); the set of features having a plurality of features (**Shetty**, p 0005); constructing a document class fuzzy set with ones of the set of features extracted from the text object (**Shetty**, p 0006; p 0102; Examiner's Note (EN): constructing a document fuzzy set is synonymous with clusters the read data using a fuzzy logic approach); each of the ones of the features extracted from the text object having a degree of membership in the document class fuzzy set and a plurality of class fuzzy sets of a knowledge base (**Shetty**, p 0006; p 0102; EN; the set of clusters represents the knowledge base); measuring a degree of match between each of the plurality of class fuzzy sets and the document class fuzzy set (**Shetty**, p 0006; p 0102); and using the measured degree of match to assign the text object a label that satisfies a selected decision making rule (**Shetty**, p 0006; p 0102; EN; a cluster is synonymous with label and the rule of assignment is synonymous with fuzzy set classification); wherein the document class fuzzy is computed by: calculating a frequency of occurrence for each feature in the set of features in the text object (**Shetty**, p 0048; EN: membership in the cluster identifies the frequency of occurrence); normalizing the frequency of occurrence of each feature in the set of features (**Shetty**, p 0025); and transforming the normalized frequency of occurrence of each feature in the set of features to define the document class fuzzy set (**Shetty**, p 0050) .

Claim 2

Shetty anticipates learning each class fuzzy set in the knowledge base (**Shetty**, p 0006; p 0102; EN: see comments of claim 1).

Claim 3

Shetty anticipates obtaining a set of class training documents (**Shetty**, p 0005); merging those training documents in the set of training documents with similar labels to create a class (**Shetty**, p 0005, Fig. 5); and computing a class fuzzy set using the class document (**Shetty**, p 0005; Fig. 5; EN: USL is compatible with the concepts of this claim; see p 2 above).

Claim 4

Shetty anticipates the set of features is extracted from the text object by: tokenizing the document to generate a word list (**Shetty**, p 0005); parsing the word list to generate the set of grammar based features (**Shetty**, p 0005); and filtering the set of grammar based features to reduce the number of features in the set of grammar based features to define the ones of the set of features extracted from the text object used to construct the document class fuzzy set (**Shetty**, p 0005)to one of ordinary skill in the art, tokenizing, parsing and filtering are synonymous with the non-parametric approach involving partitioning the unclassified data into subsets using ART).

Claim 5

Shetty anticipates filtering the set of features to reduce the number of features in the set to define the ones of the set of features extracted from the text object to

construct the document class fuzzy set (**Shetty**, p 0044; EN: the used of thresholding is a specific technique of filtering).

Claim 6

Shetty anticipates the normalized frequency of occurrence of each feature in the set of features is transformed using a bijective transformation (**Shetty**, ps 0025, 0048, 0050; EN: clustering is n dimensional and would represent a bijective or n-jective transformation).

Claims 7, 17

Shetty anticipates the degree of match between each of the plurality of class fuzzy sets and the document class fuzzy set is measured using one of a maximum-minimum strategy and a probabilistic reasoning strategy based upon semantic unification (**Shetty**, p 0102: EN: fuzzy logic clustering is synonymous with probabilistic reasoning strategy (fuzzy logic) based upon semantic unification (clustering)) .

Claims 8, 18

Shetty anticipates filtering each degree of match with an associated class specific filter function to define an activation value for its associated class rule (**Shetty**, p 0102: EN: fuzzy logic defines activation methodology); identifying the activation value of the class rule with the highest activation value (**Shetty**, p 0102); each class rule having an associated class label (**Shetty**, p 0003; EN: each cluster is unique and has an identifier or label by rule that establishes the label); and assigning the class label of the class rule with the highest identified activation value to classify the text object into one of the plurality of class fuzzy sets (**Shetty**, p 0102; EN: such is classification).

Claims 9, 19

Shetty anticipates learning each associated class specific filter function (**Shetty**, p 0102; EN: the filter function is the methodology of assigning a value to the degree of match and is anticipated by fuzzy logic methodology).

Claim 10

Shetty anticipates the decision making rule is used to identify one of a maximum value, a threshold value, and a predefined number (**Shetty**, p 0071).

Claim 11

Shetty anticipates extracting a set of granule features from the text object (**Shetty**, ps' 0005, 0073, 0094); each granule feature being represented by a plurality of fuzzy sets and associated labels (**Shetty**, p 0006, 0094, 0095; EN: fuzzy sets determine clustering and accordingly set the granularity); constructing a document granule feature fuzzy set using ones of the granule features extracted from the text object (**Shetty**, ps' 0006, 0073, 0094) ; each of the ones of the granule features extracted from the text object having a degree of membership in a corresponding granule feature fuzzy set of the document granule feature fuzzy set and a plurality of class granule feature fuzzy sets of a knowledge base (**Shetty**, ps' 0006, 0073, 0094; 102) ; computing a degree of match between each of the plurality of class granule feature fuzzy sets and the document granule feature fuzzy set to provide a degree of match for each of the ones of the granule features (**Shetty**, ps' 0073, 0094; 0102); aggregating each degree of match of the ones of the granule features to define an overall degree of match for each feature (**Shetty**, p 0073; EN: granularity is set by the threshold value and lower such value

increases clustering and lowers aggregating); and using the overall degree of match for each feature to assign the text object a class label that satisfies a selected decision making rule (**Shetty**, ps' 0073, 0102).

Claim 12

Shetty anticipates filtering the granule features extracted from the text object to define the ones of the granule features used to construct the document granule feature fuzzy set (**Shetty**, ps' 0006, 0073, 0094, 0102; EN: feature fuzzy sets are in essence scaled by the degree of granularity).

Claim 13

Shetty anticipates the filtering of the granule features is based upon one of Zipf's law and semantic discrimination analysis (**Shetty**, ps' 0006, 0073, 0094, 0102; EN: filtering is fuzzy logic methodology, granularity is scaling, and semantic discrimination analysis is clustering).

Claim 15

Shetty anticipates wherein the ones of the granule features that are used to construct the document granule feature fuzzy set are reduced to one of a predefined threshold number of granule features and range of granule features (**Shetty**, ps' 0006, 0073, 0094, 0102; EN: granularity setting a threshold typically effects the full set of features...quantity and range).

Claim 16

Shetty anticipates learning each granule fuzzy set in the knowledge base (**Shetty**, ps' 0006, 0073, 0094, 0102; EN: such is the nature of fuzzy logic and the knowledge base represented by clustering).

Claim 19

Shetty anticipates learning each associated class specific filter function (**Shetty**, p 0102; EN: the filter function is the methodology of assigning a value to the degree of match and is anticipated by fuzzy logic methodology); initializing a granule frequency distribution for each class label (**Shetty**, ps' 0079 – 0084); and converting the granule frequency distribution for each class label into a granule fuzzy set (**Shetty**, ps' 0006, 0073, 0094, 0102; EN: such is the nature of fuzzy logic and the knowledge base represented by clustering).

Claim 20

Shetty anticipates individual degrees of matches are aggregated using one of a product and an additive model (**Shetty**, p 0047, 0048; EN: Clustering represents degrees of matches).

Claim 21

Shetty anticipates estimating granule feature weights when they are aggregated as a weighted function using an additive model (**Shetty**, p 0047, 0048; EN: compatibility relationship matrix represents granule feature weights).

Claim 22

Shetty anticipates a knowledge base for storing categories represented by class fuzzy sets and associated class labels (**Shetty**, ps' 0006, 0102; EN: knowledge base is represented by clusters); a pre-processing module for representing a plurality extracted features from the text object as a document class fuzzy set (**Shetty**, ps' 0003, 0006, 0102; Fig. 5); and an approximate reasoning module for using a measured degree of match between the class fuzzy sets in the knowledge base and the document class fuzzy set to assign to the text object the associated class labels of those categories that satisfy a selected decision making rule (**Shetty**, ps' 0003, 0006, 0102; Fig. 5; EN: approximate reasoning module is the software system, measured degree is Shetty's distance and clusters are synonymous with labels) wherein the pre-processing module further comprises a fuzzy set generator for: calculating a frequency of occurrence for each feature in the set of features in the text object (**Shetty**, p 0048; EN: membership in the cluster identifies the frequency of occurrence); normalizing the frequency of occurrence of each feature of the plurality of features extracted from the text object (**Shetty**, p 0025); and transforming the normalized frequency of occurrence of each of the plurality of features extracted from the text object to define the document class fuzzy set (**Shetty**, p 0050).

Claim 25

Shetty anticipates a learning module for learning the class fuzzy sets (**Shetty**, ps' 0005, 0102).

Claim 26

Shetty anticipates a training database for creating a plurality of class documents (**Shetty**, ps' 0002, 0005, 0102); and a validation database for validating learned class fuzzy sets in the knowledge base (**Shetty**, ps' 0002, 0005, 0102; EN: to one of ordinary skill in the art Shetty's training would include validation which is nothing more than partitioning the initial training set to include a special set to be used to test the trained system to insure the trained system is "ready" and not over trained or for that matter, under trained).

Claim 27

Shetty anticipates obtaining a set of class training documents (**Shetty**, ps 0005, 0006); merging those training documents in the set of training documents with similar labels to create a class document (**Shetty**, ps 0007); and computing a class fuzzy set using the class document (**Shetty**, ps 0006).

Claim 28

Shetty anticipates a feature extractor for extracting a set of granule features from the text object (**Shetty**, ps 0073); each granule feature being represented by a plurality of fuzzy sets and associated labels (**Shetty**, ps 0047, 0048); a fuzzy set generator for constructing a document granule feature fuzzy set using a plurality of ones of the granule features extracted from the text object (**Shetty**, p 0048; EN: clustering); each of the ones of the granule features extracted from the text object having a degree of membership in a corresponding granule feature fuzzy set of the document granule feature fuzzy set and a plurality of class granule feature fuzzy sets of a knowledge base (**Shetty**, ps 0047, 0048); and an approximate reasoning module for: computing a

degree of match between each of the plurality of class granule feature fuzzy sets and the document granule feature fuzzy set to provide a degree of match for each of the ones of the granule features (**Shetty**, ps 0102); aggregating each degree of match of the ones of the granule features to define an overall degree of match for each feature (**Shetty**, ps 0102); and using the overall degree of match for each feature to assign the text object a class label that satisfies a selected decision making rule (**Shetty**, ps 0102; EN: the clusters will be associated with text object which has the relevant cluster label).

Claim 29

Shetty anticipates learning module for learning each associated class specific filter function by initializing a granule frequency distribution for each class label (**Shetty**, p 0102); and converting the granule frequency distribution for each class label into a granule fuzzy set (**Shetty**, ps 0047).

Response to Arguments

5. The rejection of claims 6, 20 and 21 under USC 112, second paragraph are withdrawn.

6. Applicant's arguments filed on March 15, 2004 related to Claims 1-13, 15-22 and 25-29 have been fully considered but are not persuasive.

In reference to Applicant's argument:

In accordance with one aspect of the invention recited in independent claims 1 and 22, fuzzy set generation involves constructing a document class fuzzy set by transforming the probability of occurrence of each feature in a set of features extracted from a text object.

In contrast, Shetty discloses neuro/fuzzy hybrid approach to clustering data. In particular, Shetty discloses a technique for clustering data in which: samples of a predetermined window length are received. The sample data is checked for uncertainty and/or robustness. The data is then clustered based on the outcome of the checking. (see paragraphs [0009] - [0011] of Shetty). Shetty discloses that the data may be clustered using either a fuzzy logic approach (see paragraphs [0048] through [0078]) or an unsupervised learning approach (see paragraphs [0079) [0097]).

Shetty further discloses that when a fuzzy logic approach is used, data is clustered "by forming a compatibility relationship matrix including the read data using a distance function such that the value obtained using the distance function is between 0 and 1" (see paragraph [0102]). That is, while the fuzzy logic approach disclosed by Shetty is based on distance function, .Applicant's claimed invention set forth in independent claims 1 and 22 involves the transformation of a probability distribution into a document class fuzzy set.

More specifically, Shetty fails to disclose or suggest as claimed by Applicant in independent claims 1 and 22 the act transforming a probability distribution into a document fuzzy set by: calculating a frequency of occurrence for each feature in the set of features in the text object; normalizing the frequency of occurrence of each feature in the set of features; and transforming the normalized frequency of occurrence of each feature in the set of features to define the document class fuzzy set.

Examiner's response:

Para 7 below applies. Shetty reads data (textual data) and transforms such data into clusters using a fuzzy logic approach (Shetty, ps 0047, 0048). To one of ordinary skill in the art, fuzzy logic is:

> A form of logic used in some expert systems and other artificial-intelligence applications in which variables can have degrees of truthfulness or falsehood represented by a range of values between 1 (true) and 0 (false), which is the characteristic or membership function. With fuzzy logic, the outcome of an operation can be expressed as a probability rather than a certainty. For example, in addition to being either true or false, an outcome might have such meanings as probably true, possibly true, possibility false, and probably false.

Shetty's frequency of occurrence is represented by the cluster membership for a given feature (Shetty, ps 0024 – 0036, i.e., number of common features). Normalization takes place related to a given attribute (Shetty, p 0025). The transformation of each feature via the fuzzy set takes place in the fuzzy membership function (Shetty, p 0050).

In reference to Applicant's argument:

In accordance with another ,aspect of the invention recited in independents claim 11 and 28, there is provided a method for classifying a text object by computing a degree of match between each of a plurality of class granule feature fuzzy sets and the document granule feature fuzzy set to provide a degree of match for each ones of the granule features of the text object, and then aggregating each degree of match of the ones of the granule features to define an overall degree of mach for each feature.

The "granularity of clustering" referred to by Shetty in paragraph [0073] concerns setting a threshold value to define clusters. In contrast, Applicant's invention as recited in independent claims 11 and 28, concerns the extraction of "granule features" (e.g., words) from a text object, where each granule feature is represented by a plurality of fuzzy sets and associated labels (see for example Figure 11, and description in section 2.A.1.c "Granule Fuzzy Set Feature Extraction" starting on page 13, line 9 of Applicant's specification).

Moreover, Shetty's reference to "granularity of clustering in paragraph [0073] fails to disclose or suggest as claimed by Applicant in independent claims 11 and 28: constructing a document granule feature fuzzy set; aggregating each degree of match of a plurality of ones of the granule features to define an overall degree of match for each feature; and using the overall degree of match to assign the text object a class label.

Examiner's response:

Para 7 below applies. The above discussion applies. Shetty at p 0048 provides clustering using fuzzy logic. Granularity is identified by Shetty at p 0073.

Examination Considerations

7. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater,* 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The

Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

8. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

9. Examiner's Opinion

Para 7 above applies. The concepts of fuzzy logic, membership functions, probability, normalization, relationships are generic to the art.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Claims 1-13, 15-22 and 25-29 are rejected.

Correspondence Information

Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anthony Knight can be reached at (703) 308-3179.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

(703) 746-7290 (for informal or draft communications with notation of "Proposed" or "Draft" for the desk of the Examiner).

Hand-delivered responses should be brought to:

Receptionist, Crystal Park II

2121 Crystal Drive,

Arlington, Virginia.

Anthony Knight
Supervisory Patent Examiner
Group 3600

Joseph P. Hirl

May 26, 2004